

RF Exposure Report

Report No.: SA171031D16C

FCC ID: 2AN9V-DVTRF001

Test Model: DVTRF001

Received Date: June 21, 2019

Test Date: July 23 to 29, 2019

Issued Date: Aug. 13, 2019

Applicant: Devialet

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
SA171031D16C	Original release.	Aug. 13, 2019

1 Certificate of Conformity

Product: WCBN3507A-D6

Brand: Devialet

Test Model: DVTRF001

Sample Status: R&D SAMPLE

Applicant: Devialet

Test Date: July 23 to 29, 2019

Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.1-1992

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Phoenix Huang, **Date:** Aug. 13, 2019
Phoenix Huang / Specialist

Approved by : May Chen, **Date:** Aug. 13, 2019
May Chen / Manager

2 RF Exposure

2.1 Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	...	...	f/1500	30
1500-100,000	...	...	1.0	30

f = Frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Formula

$$Pd = (Pout * G) / (4 * \pi * r^2)$$

where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

2.3 Classification

The antenna of this product, under normal use condition, is at least 20 cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

Original									
Antenna set 1									
Transmitter Circuit	Brand	Model	Antenna Type	2.4GHz Gain <with cable loss> (dBi)	5GHz Gain <with cable loss> (dBi)	2.4GHz Cable Loss (dB)	5G Cable Loss (dB)	Connector Type	Cable Length (mm)
Chain (0)	WNC	81-EBJ15.0 05	PIFA	3.62	Band 1&2: 3.08 Band 3: 4.76 Band 4: 4.76	1.15	Band 1&2:1.70 Band 3: 1.74 Band 4: 1.79	IPEX	300
Chain (1)	WNC	81-EBJ15.0 05	PIFA	3.62	Band 1&2: 3.08 Band 3: 4.76 Band 4: 4.76	1.15	Band 1&2:1.70 Band 3: 1.74 Band 4: 1.79	IPEX	300
Antenna set 2									
Transmitter Circuit	Brand	Model	Antenna Type	2.4GHz Gain <with cable loss> (dBi)	5GHz Gain <with cable loss> (dBi)	Cable Loss (dB)	Connector Type	Cable Length (mm)	
Chain (0)	Tongda	T-543-82010 44-A (Ant 1)	PIFA	3.572	Band 1&2: 3.002 Band 3: 4.546 Band 4: 4.416	NA	IPEX	77	
Chain (1)	Tongda	T-543-82010 44-A (Ant 2)	PIFA	3.325	Band 1&2: 2.942 Band 3: 4.622 Band 4: 4.586	NA	IPEX	61	
Antenna set 3									
Transmitter Circuit	Brand	Model	Antenna Type	2.4GHz Gain <with cable loss> (dBi)	5GHz Gain <with cable loss> (dBi)	Cable Loss (dB)		Connector Type	
Chain (0)	ethertronics	M830520	chip	1.1	3.2	NA		IPEX	
Chain (1)	ethertronics	M830520	chip	1.1	3.2	NA		IPEX	
Antenna set 4									
Transmitter Circuit	Brand	Model	Antenna Type	2.4GHz Gain <with cable loss> (dBi)	5GHz Gain <with cable loss> (dBi)	Cable Loss (dB)		Connector Type	
Chain (0)	ethertronics	1002298	PIFA	3.6	5.1	NA		IPEX	
Chain (1)	ethertronics	1002298	PIFA	3.6	5.1	NA		IPEX	
Newly									
Antenna set 5									
Transmitter Circuit	Brand	Model	Antenna Type	2.4GHz Gain <with cable loss> (dBi)	5GHz Gain <with cable loss> (dBi)	2.4GHz Cable Loss (dB)	5G Cable Loss (dB)	Connector Type	Cable Length (mm)
Chain (0)	Devialet	DVT-BA-M-1 311-P	Monopole G	3.4	5.8	0.8	1.5	IPEX	150
Chain (1)	Devialet	DVT-BA-PF-1408-P	IFA	5.2	3.3	0.8	1.5	IPEX	150
Note:									
1. All of antenna can be application for WLAN and Bluetooth.									
2. The Bluetooth technology will fix transmission on Chain (0)									

2.5 Calculation Result of Maximum Conducted Power

Operation Mode	Evaluation Frequency (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
WLAN (2.4GHz)	2437	469.401	7.36	20	0.50848	1
WLAN (U-NII-1)	5240	77.033	7.65	20	0.08921	1
WLAN (U-NII-2A)	5300	72.825	7.65	20	0.08434	1
WLAN (U-NII-2C)	5580	74.001	7.65	20	0.08570	1
WLAN (U-NII-3)	5785	61.885	7.65	20	0.07167	1
BT-EDR	2480	14.488	3.4	20	0.00631	1
BT-LE	2480	1.95	3.4	20	0.00085	1

Note:

2.4GHz: For newly antenna set, the directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 7.36 \text{ dBi}$

5GHz: For newly antenna set, the directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 7.65 \text{ dBi}$

Conclusion:

The formula of calculated the MPE is:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$

CPD = Calculation power density

LPD = Limit of power density

WLAN 5GHz + Bluetooth = $0.08921 / 1 + 0.00631 / 1 = 0.09552$

Therefore the maximum calculations of above situations are less than the "1" limit.

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